

WHAT IS CLAIMED IS:

1. An internal combustion engine for a watercraft having a hull defining a center plane extending generally vertically from bow to stern, comprising a cylinder body defining at least one cylinder bore, an axis of the cylinder bore slanting from the center plane, a piston reciprocating within the cylinder bore, a cylinder head member closing an end of the cylinder bore and defining a combustion chamber with the cylinder bore and the piston, a first set of passages having at least two passages communicating with the combustion chamber, a first set of valves arranged to selectively connect and disconnect the first set of passages with the combustion chamber, a second set of passages having at least one second passage communicating with the combustion chamber, the second set of passages being fewer in number than the first set of passages, and a second set of valves comprising at least one valve arranged to selectively connect and disconnect the at least one passage of the second set of passages with the combustion chamber, the first set of valves being disposed closer to the center plane than the second set of valves.

2. The internal combustion engine as set forth in Claim 1, wherein both the first and second set of valves exist on the same side of the center plane within the hull.

3. The internal combustion engine as set forth in Claim 1 additionally comprising a crankshaft, a connecting rod rotatably connecting the crankshaft with the piston, the piston having an axis at which the connecting rod is rotatably coupled with the piston, and the axis generally extending within the center plane during at least one point of reciprocal travel of the piston within the cylinder bore.

4. The internal combustion engine as set forth in Claim 3, wherein the piston reciprocates between the top dead center and the bottom dead center, and the axis generally exists on the center plane when the piston is at the top dead center.

5. The internal combustion engine as set forth in Claim 1, wherein the second set of valves includes at least two valves.

6. The internal combustion engine as set forth in Claim 5, wherein the first set of valves has three valves and the second set of valves has two valves.

7. The internal combustion engine as set forth in Claim 1, wherein the passages of the first set of passages are arranged to introduce the air to the combustion chamber and the at least one passage of the second set of passages is arranged to receive the exhaust gases from the combustion chamber.

8. The internal combustion engine as set forth in Claim 1 additionally comprising at least one camshaft arranged to actuate at least some of the valves, and the camshaft extending generally in parallel to the center plane.

5 9. The internal combustion engine as set forth in Claim 8, wherein the engine includes a first camshaft and a second camshaft, the first camshaft actuates the first set of valves, the second camshaft actuates the at least one valve of the second set of valves, and the first camshaft lies closer to the center plane than does the second camshaft.

10 10. The internal combustion engine as set forth in Claim 8, wherein the camshaft has cam lobes configured to push the first and second valves.

10 11. The internal combustion engine as set forth in Claim 1, wherein at least one of the passages of the first set of passages extends across the center plane.

12. The internal combustion engine as set forth in Claim 11, wherein the passages of the first set of passages are arranged to introduce the air into the combustion chamber.

15 13. The internal combustion engine as set forth in Claim 1, wherein the cylinder bore extends across the center plane.

14. The internal combustion engine as set forth in Claim 1, wherein the engine includes at least two cylinder bores, and the cylinder bores are spaced apart from each other along the center plane.

20 15. The internal combustion engine as set forth in Claim 1 additionally including an ignition control system that operates on a four-stroke cycle combustion principle.

25 16. An internal combustion engine for a watercraft having a hull defining a center plane extending generally vertically from bow to stern, comprising a cylinder body mounted within the hull, the cylinder body defining at least one cylinder bore, a piston reciprocating within the cylinder bore, a cylinder head member closing an end of the cylinder bore and defining a combustion chamber with the cylinder bore and the piston, the cylinder head member slanting toward one side of the hull from the center plane, a plurality of air intake passages introducing air to the combustion chamber, and at least one exhaust passage receiving exhaust gases from the combustion chamber, the number of air intake passages being greater than the number of the at least one exhaust passage,
30 air intake valves arranged to selectively open and close the air intake passages, at least one exhaust valve arranged to open and close the at least one exhaust passage, an intake camshaft arranged to actuate the intake valves, an exhaust camshaft arranged to actuate the exhaust valve, both the intake and exhaust camshafts extending generally in parallel

to the center plane, and the intake camshaft lying closer to the center plane than the exhaust camshaft.

17. The internal combustion engine as set forth in Claim 16, wherein at least one of the air intake passages extend across the center plane.

5 18. The internal combustion engine as set forth in Claim 16, wherein the cylinder bore extends across the center plane.

19. The internal combustion engine as set forth in Claim 16, wherein both the intake and exhaust camshafts lie on the same side of the center plane within the hull.